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ABSTRACT

In order to better understand the factors that contribute to student attrition in community colleges, a study was undertaken to track a cohort of 1990 first-time students at a Florida public community college for 2 years. Once the cohort students were identified, a file was built containing both demographic and academic attributes, including age, race, sex, first term grade point average, scores on three subsets of placement tests, full-time/part-time status, enrollment in college preparatory courses, financial aid status, degree expectations, and type of high school diploma earned. These variables were analyzed to develop a functional relationship to students' continued enrollment or continuing education elsewhere in fall 1991 and fall 1992. Students found to be most likely to remain enrolled were "traditional" students, defined as young, not working full-time, not enrolled in college preparatory courses, attending college full-time, and earning high grades. Students least likely to return were older, part-time students who worked full-time and enrolled in college preparatory courses. In addition, having a standard high school diploma increased the likelihood of first-year retention by a factor of 4.5. The study concluded that, since the population found to be least likely to persist is also the majority population at most public community colleges, colleges should keep this profile in mind when developing intervention strategies. (MAB)

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At Public Community Colleges

Southeastern Association for Community Colleges
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The Relative Importance of Selected Factors to Attrition
At Public Community Colleges

Introduction

The purpose of this investigation was to identify the relative importance to student attrition of a selected set of factors. The factors were selected from a larger group of factors that had been shown to be significantly related to attrition at other community colleges. The college under consideration is one of twenty-eight in the public community college system of Florida. The public community college system in Florida was established to serve those students who, for whatever reason, were not able to participate fully in a university setting. This access has been made available via an "open door" policy. While this has exposed more individual to higher education, it has been accompanied by low graduation rates.

Community colleges need to explore ways to improve the graduation rate of the college by improving the processes that allow students to remain enrolled. This improvement requires understanding the factors that contribute to student attrition and determining how they are related to one another. Once the process is understood, intervention which could reduce attrition can be investigated.

Basis of Study

It has become increasing clear over the past two decades that the process of leaving a college is a complex one (Tinto, 1975; Bean and Metzner, 1985). Many different factors contribute to the final decision to leave. This decision can be viewed as either positive or negative. If the student has obtained their educational goals, leaving may be the most appropriate choice. However, if goals have not been obtained, then the

leaving could be classified as "dropping-out". The important factor is to divide dropouts into those cases for which an institution might be able to offer assistance and those that are not under institutional control (Tinto, 1982).

In order to better understand what factors were influencing attrition at the public community college under consideration, a cohort was developed from the fall 1990 first-time-in-college students (Windham, 1994). This cohort was tracked via social security number in both the internal records of the college and the Florida Education and Training Placement Information Program (FETPIP) follow-up system. The follow-up period was for two years.

Development of the Cohort

Once the cohort students had been identified, a file was built which contained both demographic and academic attributes. Those attributes were age, race, sex, first term grade point average (GPA), scores on the three subtests of the MAPS placement tests, full-time/part-time status, whether or not the student was enrolled in a college preparatory class the first semester, financial aid status, student initial intent coded as AA or other, the type of high school diploma earned, whether the student was still attending the college in fall 1991, and whether they were still in attendance in fall 1992. If a student had earned a diploma or certificate during the follow-up period, they were considered to be still in attendance for the purpose of this study.

The following environmental items were taken from the results of the FETPIP follow-up: whether or not the student was employed in fall 1991 and/or fall 1992, and whether or not the employment was full-time. The final item incorporated into the file was

whether or not the student was continuing their education. Continuing education was defined as being enrolled in any of the public community colleges, universities, trade schools, or private colleges that participate in the FETPIP tracking program. As with the data elements indicating continued attendance at the public community college under consideration, if a student had received a diploma or certificate during the follow-up period under consideration, they were coded as continuing their education. Full-time employment was calculated using the algorithm defined by FETPIP. If a person worked at least twelve weeks in the quarter being tracked and earned at least $2040, they were considered to be working full-time.

Dependent Variables

The four outcome variables being investigated were all parameterized as yes/no, i.e., either a student was in attendance or continuing their education at the time or they were not. Table 1 provides a list of the variable names and definitions.

Table 1
Variable Name and Definition

Independent

RACE	White, Black or Other
SEX	Male or Female
AGE	Age during fall 1990
DIP	High School diploma or other credential,e.g., GED
PMATH	Score on mathematics portion of placement test
PWRITE	Score on writing portion of placement test
PREAD	Score on reading portion of placement test
GPA1	Grade point average as of end of fall 1990
PREP	Taking a college prep course fall 1990
FATYPE	Receiving financial aid
FTPT	Full-time or part-time fall 1990

Table 1 continued

INTENT	Degree intent - AA or other
FOUNDEM1	Employed in fall 1991
FOUNDEM2	Employed in fall 1992
EMPFT1	Employed full-time in fall 1991
EMPFT2	Employed full-time in fall 1992

Dependent

HERE1	Enrolled at the college in fall 1991
HERE2	Enrolled at the college in fall 1992
CONTED1	Enrolled in higher education in fall 1991
CONTED2	Enrolled in higher education in fall 1992

Table 2 presents a profile of the cohort for both the independent and dependent variables.

Table 2
Profile of Fall 1990 Cohort
(N=1425)
Independent Variables

AGE	Mean 20.2 Range 15 - 79
GPA1	Mean * Range 0 - 4
PMATH	Mean 210.0 Range 201 - 225
PREAD	Mean 15.9 Range 1 - 25
PWRITE	Mean 34.5 Range 20 - 60
SEX	Male 48.7% Female 51.3%
RACE	White 75.5% Black 20.5 Other 4.0%
DIP	Regular 97.3% Other 2.7%
PREP	Yes 50.2% No 49.8%
FATYPE	Yes 15.2% No 84.8%
FTPT	Full-time 33.7% Part-time 66.3%
INTENT	AA 90.5% Other 9.5%
FOUNDEM1	Yes 58.5% No 41.5%
EMPFT1	Yes 20.1% No 79.9%
FOUNDEM2	Yes 60.5% No 39.5%
EMPFT2	Yes 26.6% No 73.4%

Dependent Variables

HERE1	Yes	58.3%	No	41.7%
CONTED1	Yes	66.5%	No	33.5%
HERE2	Yes	45.3%	No	54.7%
CONTED2	Yes	56.1%	No	43.9%

* The mean GPA is not reported because students receive zero grade points for college prep courses as well as failing to pass a course. Some students take only college prep courses their first semester, and thus the mean GPA based upon this data set, which does not distinguish between these two groups, would have been artificially deflated.

Statistical Method

The statistical method used to develop a functional relationship between the independent variables and the dichotomous outcomes was logistic regression. This procedure has been specifically designed to deal with the situation of an outcome variable which takes on only two values (Demaris, 1992). As with the more common linear regression, logistic regression calculates an equation comprised of additive terms. The results of interest in this study were both the significant variables in these equations and the odds ratios that were derived from the coefficients of the significant variables.

These odds ratios indicate for a dichotomous status variable the expected probability of a student with the trait achieving the parameterized outcome compared to the expected probability of a student without the trait achieving the same outcome. For the study, the parameterized outcome was set as either remaining enrolled or remaining in the educational system.

Significant Variables

Table 3 presents a comparison of the variables that were significant for each of the four outcomes. In addition to the independent variables listed in Table 1, several

interactions were entered into a logistic regression procedure. Those interactions were race by sex, race by receiving financial aid, race by full-time/part-time, race by taking college prep, sex by receiving financial aid, sex by full-time/part-time, and taking college prep by receiving financial aid. These interactions were chosen based upon previous analyses conducted at the college under consideration and a review of important factors at other two-year colleges.

Table 3
Comparison of Significant Logistic Regression Results

Variable	HERE1	CONTED1	HERE2	CONTED2
AGE	*	***	**	**
GPA1	***	***	***	***
DIP	***	***		
EMPFT1	***	***		
FOUNDEM1	*	***		
PMATH	***	**	***	***
PWRITE	**	**		
RACExSEX			**	
PREP			**	***
FOUNDEM2			***	***
EMPFT2			***	***
RACExFTPT			***	
FTPT				***

* significant at the .10 level
** significant at the .05 level
*** significant at the .01 level

Three individual and one set of variables were significant across all cases. The individual variables were AGE, GPA1 and PMATH. The set of variables was the employment variables, both whether the person was employed and whether or not that employment was full-time. The writing segment of the MAPS test, PWRITE, and the type

of high school diploma earned, DIP, were significant for first year outcomes but not those of the second year. Taking a college prep class the first semester, PREP, was just the opposite. Full-time/part-time enrollment status was significant the second year by itself for continuing education, CONTED2, and via the RACExFTPT interaction for enrolled at the college, HERE2. The other significant interaction was RACExSEX which was significant the second year for enrolled at the college, HERE2.

These results tend to imply that there are differences among the variables that are significant for first year attrition versus second year. However, caution must be used in interpreting these results because the same students were involved in each outcome.

Odds Ratios

Table 4 presents a comparison of the odds ratios for the different outcomes.

Table 4
Comparison of Odds Ratios

Variable	HERE1	CONTED1	HERE2	CONTED2
AGE	.93	.91	.91	.90
GPA1	1.40	1.44	1.30	1.34
DIP	4.50	3.81		
EMPFT1	.63	.48		
FOUNDEM1	1.29	1.94		
PMATH	1.12	1.11	1.16	1.19
PWRITE	.89	.88		
RACEXSEX			(1)	
PREP			.63	.57
FOUNDEM2			1.89	2.97
EMPFT2			.55	.43
RACExFTPT			(1)	
FTPT				1.82

(1) discussed in text

The odds ratios have been calculated on the standardized estimates for continuous variables in order to make direct comparisons among the different variables. The results for continuous variables will be discussed first and then the results for categorical variables.

The most important continuous variable is GPA1. The odds ratio indicates that a standard deviation change in the first semester GPA will improve the ratio of remaining enrolled at the college under consideration by a factor of 1.40 the first year and 1.30 the second. The second most important continuous variable is the math portion of the MAPS placement test. For each standard deviation increase in the test results, the ratio of remaining enrolled at the college increases by a factor of 1.12 the first year and 1.16 the second.

Another continuous variable is age. The impact of this variable is negative for all outcomes. For each standard deviation increase, the ratio of remaining enrolled declines by a factor of .93 to .90. The age distribution of this cohort was highly concentrated in the 18 to 21 year range with seventy percent of the cohort having ages in that range. Thus, the impact of age is heavily influenced by this small age range. Further work with this variable indicted that age was not significant by itself for students above the mid-twenties. This would appear to be in contrast with the studies cited by Bean and Metzner which led to their use of 24 as a defining age for traditional/non-traditional students.

The final continuous variable is the writing section of the MAPS placement test. This was the hardest variable to interpret due to the apparent negative impact on remaining enrolled. For each standard deviation increase in the test results, the ratio of

remaining enrolled declined by a factor of .88 or .89. A simple cross tabulation between this variable and the outcome variables indicated that in contrast to the anticipated result, the percentage of persons retained did not steadily increase as the writing scores increased.

The remaining significant variables are either categorical or status, i.e. either the trait is there or it is not. Of these employment is the most influential. Being employed increases the likelihood of remaining enrolled compared to leaving by a factor ranging from 1.11 to 2.97 depending upon the outcome under consideration. However, being employed full-time decreases the likelihood of remaining enrolled by almost the same amount for all outcomes.

The importance of taking the standard high school curriculum versus GED or other methods of obtaining a diploma is seen in the positive influence of DIP. Having a standard diploma increases the likelihood of first-year retention by a factor of 4.5 for the college and 3.81 for higher education. It was not significant for the second year.

Having to take a college preparatory class the first semester and being full-time versus part-time are significant variable for retention to the third fall but not the second. This would appear to imply that these are situations that come into play in the later part of a college career.

Two interactions were found to be significant the second year for remaining enrolled at the college. Race by sex and race by full-time/part-time were influential for the Other race category. This category is mostly Hispanics with a small percentage of Native American and Unknowns. The odds ratio of .22 for Other Males versus Other

Females implied Other Males were about one-fifth as likely to remain enrolled in college as Other Females.

The significant components of the race by full-time/part-time interaction implied that full-time Other students were much more likely to remain enrolled than part-time Other students and Other full-time students were much more likely to remain enrolled than White full-time students.

These outcomes are in sharp contrast to other analyses which have indicated that Hispanic students tend to have a very high attrition rate (Nora, 1987).

Summary

The student most likely to remain enrolled either at the college or in higher education is the one that fits the profile of what has come to be known at the traditional. They are young, probably entering college directly out of high school. They do not work full-time, or take college prep classes the first semester. They have a standard high school diploma, attend college full-time and make good grades.

Students most likely to not return to either the college or higher education are older when they start, working full-time, attending college part-time and take college prep classes. The above description has become the profile of the majority student at most public community colleges. As those colleges work to develop intervention strategies, the implications of this profile for attrition must be kept in mind.

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